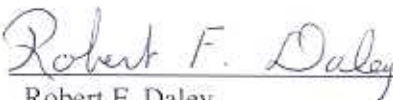
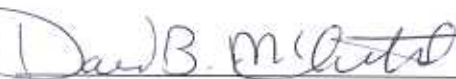

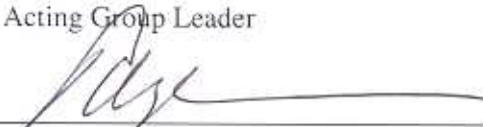


CRITERION 502

EXTERIOR LIGHTING SYSTEMS

SIGNATURES

 Robert F. Daley Criterion Author	<u>2/13/03</u> Date	<u>FWO-SEM</u> Group	<u>667-8882</u> Phone Number
 David McIntosh Maintenance Engineering Team Leader	<u>2-12-03</u> Date	<u>FWO-SEM</u> Group	<u>667-3616</u> Phone Number
 Kurt Beckman Acting Group Leader	<u>2/13/03</u> Date	<u>FWO-SEM</u> Group	<u>667-6261</u> Phone Number
 Facility Management Council Committee Chairperson	<u>2.27.03</u> Date	<u>FMC</u> Group	<u>667-9364</u> Phone Number

RECORD OF REVISIONS

Revision No.	Date	Description
0	08/27/98	Initial Issue.
1	1/16/02	<p>This revision incorporates formatting revisions in Revision 3 of the O&M Criterion 101 Writer's Guide. Major revisions to this document includes:</p> <ul style="list-style-type: none">• The addition of a Table of Contents,• The use of Basis Statements in Sections 6, 7, and 9,• Incorporates "Lessons Learned" in Section 6, "Requirements," from 1/1/95 to 6/200.• Revision to Section 9, "Required Documents," and• Further clarification in the use of references.

TABLE OF CONTENTS

1.0	PURPOSE.....	1
2.0	SCOPE.....	1
3.0	ACRONYMS AND DEFINITIONS.....	1
3.1	Acronyms	1
3.2	Definitions	2
4.0	RESPONSIBILITIES	2
4.1	FWO-Systems, Engineering and Maintenance (SEM).....	2
4.2	Facility Manager.....	2
4.3	Group Leader	3
4.4	Authority Having Jurisdiction (AHJ) - POC for Electrical Chapter of LANL Engineering Manual	3
5.0	PRECAUTIONS AND LIMITATIONS	3
5.1	Precautions	3
5.2	Limitations	4
6.0	REQUIREMENTS	4
6.1	Operations Requirements	4
6.2	Maintenance Requirements	5
7.0	RECOMMENDATIONS AND GOOD PRACTICES	5
7.1	Operations Recommendations	5
7.2	Maintenance Recommendations	5
8.0	GUIDANCE	6
8.1	Operations Guidance	6
8.2	Maintenance Guidance	6
9.0	REQUIRED DOCUMENTATION.....	7
10.0	REFERENCES	7
11.0	APPENDICES	8

CRITERION 502**EXTERIOR LIGHTING SYSTEMS****1.0 PURPOSE**

The purpose of this Criterion is to establish the minimum requirements and best practices for operation and maintenance of exterior lighting systems for both safety and security at LANL. The maintenance of security lighting systems is aimed at preserving the light producing capability of the lighting systems at the original design level as specified in DOE Manual 5632.1C, Chapter VI-6. (Ref. 10.6) This document addresses requirements of LIR 230-05-01, (Ref 10.1), "Operations and Maintenance Manual."

Implementation of these requirements and recommendations satisfies DOE Order 430.1A (Ref. 10.2), "Life Cycle Asset Management," Attachment 2 "Contractor Requirements Document," Paragraph 2, sections A through C, which in part require UC to "...maintain physical assets in a condition suitable for their intended purpose" and employ "preventive, predictive, and corrective maintenance to ensure physical asset availability for planned use and/or proper disposition." Compliance with DOE Order 430.1A is required by Appendix G of the UC Contract.

2.0 SCOPE

The scope of this Criterion includes the routine inspection, preventive and predictive maintenance of LANL exterior lighting systems as specified in DOE Manual 5632.1C, Chapter XII. (Ref. 10.7) This Criterion does not address corrective maintenance actions required to repair or replace equipment.

3.0 ACRONYMS AND DEFINITIONS**3.1 Acronyms**

AHJ	Authority Having Jurisdiction
CFR	Code of Federal Regulations
DOE	Department of Energy
LIG	Laboratory Implementing Guidance
LIR	Laboratory Implementing Requirement
LPR	Laboratory Performance Requirement

O&M	Operations and Maintenance
PFSS	(LANLs) Protective Force Services Subcontractor
PPE	Personal Protective Equipment
PP&PE	Personal Property and Programmatic Equipment
RP&IE	Real Property and Installed Equipment
SSC	Structures, Systems, and Components
UC	University of California

3.2 Definitions

Cleaning. The removal of accumulated dirt and other contaminants from lamps, reflectors, and lenses.

Group Relamping. The replacement of all the lamps in an area at a defined time interval or when the lighting system output falls below the desired level.

Rated-Average Lamp Life. The number of operating hours at which one-half of lamps will have failed.

Spot Relamping. The replacement of individual lamps as they fail.

4.0 RESPONSIBILITIES

4.1 FWO-Systems, Engineering and Maintenance (SEM)

4.1.1 FWO-SEM is responsible for the technical content of this Criterion and monitoring the applicability and the implementation status of this Criteria and either assisting the organizations that are not applying or meeting the implementation expectations contained herein or elevating their concerns to the director(s).

Basis: LIR 301-00-01.11; Issuing and Managing Laboratory Operations Implementation Requirements and Guidance, Section 5.4, OIC Implementation Requirements.

4.1.2 FWO-SEM shall provide technical assistance to support implementation of this Criterion.

4.2 Facility Manager

4.2.1 Responsible for operations and maintenance of institutional, or Real Property and Installed Equipment (RP&IE) under their jurisdiction, in accordance with the requirements of this document.

- 4.2.2** Responsible for operations and maintenance of those Personal Property and Programmatic Equipment (PP&PE) systems and equipment addressed by this document that may be assigned to the FM in accordance with the FMU-specific Facility/Tenant Agreement.

4.3 Group Leader

- 4.3.1** Responsible for operations and maintenance of those Personal Property and Programmatic Equipment (PP&PE) systems and equipment addressed by this document that are under their jurisdiction
- 4.3.2** Responsible for system performance and subsequent replacement or refurbishment of assigned PP&PE.

4.4 Authority Having Jurisdiction (AHJ) - POC for Electrical Chapter of LANL Engineering Manual

- 4.4.1** The AHJ is responsible for providing a decision on a specific technical question regarding this criterion.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Precautions

This section is not intended to identify all applicable precautions necessary for implementation of this Criterion. A compilation of all applicable precautions shall be contained in the implementing procedure(s) or work control authorization documents. The following precautions are intended only to assist the author of a procedure or work control document in the identification of hazards and precautions that may not be immediately obvious.

- 5.1.1** Consider ballasts and capacitors manufactured before 1978 and ballasts and capacitors with no labeling concerning PCB content as PCB-containing. Dispose of PCB-containing ballasts and capacitors following LIR 404-00-03. (Ref. 10.10)
- 5.1.2** Consider used fluorescent or high intensity discharge (HID) lamps with no labeling concerning mercury content as mercury-containing. Dispose of mercury-containing lamps following LIR-404-00-03. (Ref.10.10)
- 5.1.3** Consider used incandescent and high intensity discharge lamp bases as lead-containing. Dispose of lead-containing lamp bases following LIR 404-00-03. (Ref.10.10)

- 5.1.4** Smoking or odorous ballasts are a potential fire hazard. Investigate and repair these items.

5.2 Limitations

The intent of this Criterion is to identify the minimum generic requirements and recommendations for SSC operation and maintenance across the Laboratory. Each user is responsible for the identification and implementation of additional facility-specific requirements and recommendations based on their authorization basis and unique equipment and conditions, (e.g., equipment history, manufacturer warranties, operating environment, vendor O&M requirements and guidance, etc.).

Nuclear facilities and moderate to high-hazard non-nuclear facilities will typically have additional facility-specific requirements beyond those presented in this Criterion. Nuclear facilities shall implement the requirements of DOE Order 4330.4B (Ref. 10.3) as the minimum programmatic requirements for a maintenance program. Additional requirements and recommendations for SSC operation and maintenance may be necessary to fully comply with the current DOE Order or CFR identified above.

- 5.2.1** Work performed from aerial lifts or similar devices shall conform to 29CFR1910.67(c).
- 5.2.2** Replaced lamps and ballasts should be disposed in a manner consistent with LIR402-600-01.

6.0 REQUIREMENTS

Minimum requirements that Criterion users shall follow are specified in this section. Requested variances to these requirements shall be prepared and submitted to FWO-SEM in accordance with LIR 301-00-02 (Ref. 10.4), "Variances and Exceptions to Laboratory Operations Requirements," for review and approval. The Criterion users are responsible for analysis of operational performance and SSC replacement or refurbishment based on this analysis. Laws, codes, contractual requirements, engineering judgement, safety matters, and operations and maintenance experience drive the requirements contained in this section.

6.1 Operations Requirements

No requirements beyond those stated in Section 5.2, Limitations.

6.2 Maintenance Requirements

- 6.2.1** Corrective maintenance shall be initiated within 24 hours of the indication of malfunction of security lighting system elements for systems protecting Category I and II quantities of special nuclear material, vital equipment, and Top Secret matter. Compensatory measures shall be implemented immediately when any part of the security lighting system is out of service and shall be continued until maintenance is complete and the lighting system element is back in service.

Basis: DOE M5632.1c-1, Chapter XII-2a. (Ref. 10.7)

- 6.2.2** Corrective maintenance shall be initiated within 72 hours of detection of a noncritical system element protecting Category I and Category II special nuclear material, vital equipment, and Top Secret matter. Corrective maintenance for a noncritical system protecting other assets shall be determined by the facility manager. The local cognizant authority for safeguards and security shall determine if compensatory measures are necessary.

Basis: DOE M5632.1c-1, Chapter XII-2b. (Ref. 10.7)

7.0 RECOMMENDATIONS AND GOOD PRACTICES

The information provided in this section is recommended based on acceptable industry practices and should be implemented by each user based on his/her unique application and operating history of the subject systems/equipment.

7.1 Operations Recommendations

No recommendations beyond those stated in Section 5.2, Limitations.

7.2 Maintenance Recommendations

- 7.2.1** Group relamping should occur every four (4) years.

Basis: TM 5-684, Chapter 6-7a(1). (Ref. 10.9)

- 7.2.2** Dirt should not be allowed to accumulate on lenses to a point that causes 15 percent lighting depreciation. Cleaning of lenses annually is recommended.

Basis: TM 5-684, Chapter 6-7b(2). (Ref. 10.9)

- 7.2.2.1** Clean fixtures with mild soap or equivalent non-abrasive cleaner approved by fixture manufacturer; allow fixture to drip dry.

Basis: TM 5-684, Chapter 6-7b(2). (Ref. 10.9)

- 7.2.2.2** At time of annual cleaning, clean photocells with mild detergent. If photocell has failed (lights on during daylight) and cleaning photocells does not correct the problem then discard photocell and replace with new.

Basis: TM 5-684, Chapter 6-8c(3). (Ref. 10.9)

- 7.2.2.3** Mechanical time switches should be inspected and adjusted annually, per manufacturer's recommendations. Units should be overhauled or replaced every five years.

Basis: TM 5-684, Chapter 6-8a. (Ref. 10.9)

8.0 GUIDANCE

8.1 Operations Guidance

No implementing guidance available.

8.2 Maintenance Guidance

No implementing guidance available.

9.0 REQUIRED DOCUMENTATION

Maintenance history shall be maintained by PFSS for exterior security lighting systems and FM will maintain history for all non-security exterior lighting systems to include, as a minimum, the parameters listed in the Table 9-1 below:

Table 9-1 Documentation Parameters

MAINTENANCE HISTORY DOCUMENTATION PARAMETERS				
PARAMETER	ML 1	ML 2	ML 3	ML 4
Maintenance Activities				
Repair / Adjustments	X	X	X	X
PM Activities	X	X	X	
Equipment Problems				
Failure Dates	X	X	X	
Failure Root Cause	X	X	X	
Inspection Results				
Inspection Date	X	X	X	
SSC Condition	X	X	X	

Basis: Documentation of the parameters listed in Table 9-1 above satisfies the requirements of LPR 230-07-00, Criteria 2, (Ref. 10.5) which states; "Maintenance activities, equipment problems, and inspection and test results are documented."

10.0 REFERENCES

The following references, and associated revisions, were used in the development of this document.

- 10.1** LIR 230-05-01.0, Operation and Maintenance Manual.
- 10.2** DOE O 430.1A, Attachment 2 "Contractor Requirements Document" (Paragraph 2, Sections A through C), a requirement of Appendix G of the UC Contract.
- 10.3** DOE Order 4330.4B, Maintenance Management Program, Section 3.4.9.
- 10.4** LIR 301-00-02.0, Variances and Exceptions to Laboratory Operation Requirements.
- 10.5** LPR 230-07-00, Maintenance History, Performance Criteria [2].
- 10.6** DOE Manual 5632.1C, Chapter VI, Intrusion Detection and Assessment Systems.
- 10.7** DOE Manual 5632.1C, Chapter XII, Maintenance.

Criterion 502: Exterior Lighting Systems

Date: 1/22/03

Revision 1

10.8 LIR 402-600-01.1, Electrical Safety.

10.9 TM 5-684, Chapter 6, Departments of the Army, The Navy, and the Air Force, Technical Manual: Facilities Engineering Electrical Exterior Facilities.

10.10 LIR 404-00-03.1, Hazardous & Mixed Waste Requirements.

11.0 APPENDICES

None